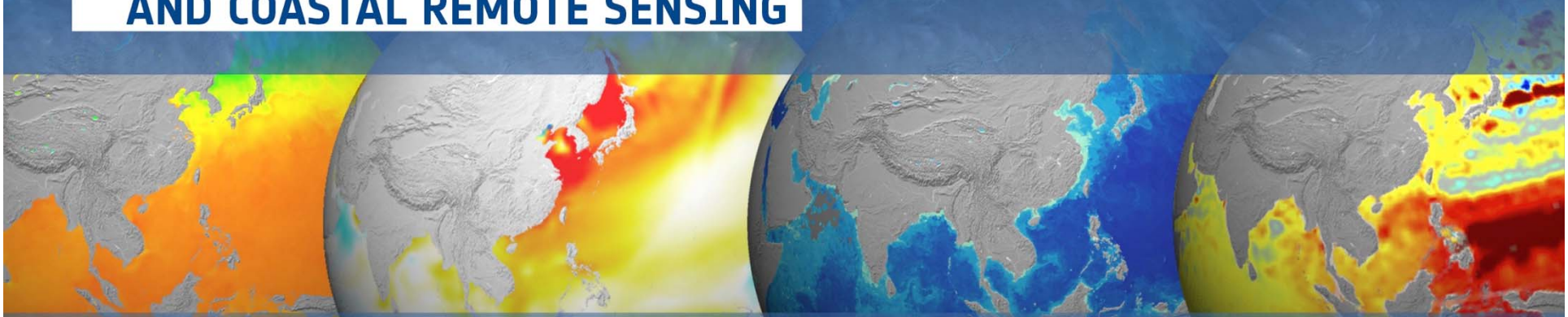
ESA–MOST China Dragon 4 Cooperation

→ ADVANCED TRAINING COURSE IN OCEAN AND COASTAL REMOTE SENSING



12 to 17 November 2018 | Shenzhen University | P.R. China

Training course summary

Hosted by

Thanks to the local organisers

Prof. Wu Guofeng, Wang Chisheng & Wang Dan and all technical & administrative support team

- **All transfers airport to hotel & daily to SZU**
- **Local logistics & 2 social events**
- **All technical support before and during course**
- **Hosting & organising of the poster session**

All SZU administrative & technical staff

Thanks to the organising committee:

Drs. Wang Qi'an & Zhang Songmei, Profs. Li Zengyuan & Gao Zhihai, Dr. Wang Sisi, Dr. Zhang Chi

Yves-Louis Desnos & Eric Doyle

Dr. Andy Zmuda & Ms. Irene Renis

Prof. Bob Su, Drs. Yijian Zeng & Ju Dunping, Ms.Wang Lichun,

Thanks to 20 Chinese & European lecturers

LECTURING TEAM

Sea surface temperature from thermal EO data

· Francesco Nencioli	Plymouth Marine Laboratory	UK

Climate change in polar and other regions

· Cheng Xiao	Beijing Normal University	China
· Bai Yan	Second Institute of Oceanography, SOA	China
· Johnny Johannessen	Nansen Environmental and Remote Sensing Center	Norway

Ocean colour from optical EO data

· Tang Danling	South China Sea Institute of Oceanology, CAS	China
· Tom Jackson	Plymouth Marine Laboratory	UK

Sea surface height from radar altimeters

· Marie-Hélène Rio	ESA–ESRIN	Italy
· Marco Restano	Serco c/o ESA-ESRIN	Italy
· Yang Jungang	First Institute of Oceanography, SOA	China

Ocean retrievals using EO data

· Yin Xiaobin	Beijing Piesat Information Technology Co. Ltd.	China
· Zhang Xi	First Institute of Oceanography, SOA	China
· Zhu Jiasong	Shenzhen University	China
· Shen Fang	East China Normal University	China
· Roberto Sabia	Telespazio-Vega c/o ESA-ESRIN	Italy

Geophysical parameters retrieval from SAR

· Meng Junmin	First Institute of Oceanography, SOA	China
· Yang Jingsong	Second Institute of Oceanography, SOA	China
· Werner Alpers	University of Hamburg	Germany
· Fabrice Collard	Ocean Data Lab	France
· Sylvain Herlédan	Ocean Data Lab	France
· Lucile Gaultier	Ocean Data Lab	France

Poster session Tues. evening

- 31 Posters presented
  - **10 categories**
- Thanks to all who presented a poster
- All well presented and interesting

Thanks to the 10 poster adjudicators

Ocean & coastal zones categories	Adjudicators
Corrections, retrievals & validation	Tom Jackson
SAR, InSAR & POLSAR mapping & applications	Werner Alpers
Altimetry & ocean dynamics	Marie-Hélène Rio
Coastal zones mapping & monitoring	Tang Danling & Marco Restano
Optical measurements, mapping & applications	Roberto Sabia
Remote sensing for environmental monitoring applications	Wang Chisheng

Lakes & land categories	Adjudicators
Optical mapping, change detection & retrievals	Yijian Zeng
SAR, InSAR & POLSAR mapping & applications	Andy Zmuda
Lake monitoring & retrievals	Francesco Nencioli
Land and inland water temperature, fluxes & exchanges	Lichun Wang

All Course material will be loaded to ftp

SZU will provide access details by email within 21/11/18

Training Material:

Already provided✓	• Overview programme (.pdf)
Already provided✓	• Daily programme (.pdf)
ftp site Sat. AM	• Lecturers' presentations (.pdf)
Already provided✓	• Practical Sessions Instructions (.pdf)
Already provided✓	• All open source software
Already provided✓	• All course datasets
Already provided✓	• Technical publications (all .pdf)

- ESA SP-1322/1 /2 /3 Sentinels 1, 2 and 3
- Earth Explorers' Brochures / Info

Assignment of days training

Training modules	Days
ESA & Chinese EO programmes & missions	0.25
Theory & principles in **optical, thermal & microwave remote sensing** for ocean and coastal retrievals and montiroing	2.5
Practical classes, EO data processing and geo-phys. products & synergy	2.75
10 practical classes ✓ **2 on SSS & retrievals** **2 on RA & retrievals** **1 on OC & retrievals** **1 on SST retrievals** **1 on OC & SST synergy** **2 on SAR wind / wave & currents** **1 on polar regions**	

Survey Questionnaire

Exit this survey

ESA-MOST Dragon 4 Advanced Training Course in Ocean and Coastal Remote Sensing

On-line Course Evaluation

- To provide feed back to improve for the future

Please take the time to answer a few questions on the course, its organisation and contents. Please tick the appropriate boxes.

* **1. Have you used ESA and/or Copernicus Sentinels Earth Observation data prior to this course?**

- ◯ Yes
- ◯ No

* **2. Are you likely to use ESA and/or Copernicus Sentinels Earth Observation data following the course?**

- ◯ Yes
- ◯ No

* **3. How will you go about accessing ESA and/or Copernicus Sentinels EO data and what research will you undertake?**

Course Feedback – results of questionnaire (n completed)

EO data utilization	Yes %	No %
Have you used ESA and/or Copernicus Sentinels Earth Observation data prior to this course?	64	36
Are you likely to use ESA and/or Copernicus Sentinels Earth Observation data following the course?	100	0

Utilisation- many applications:

- Oceanic geo-physical retrievals
- Waves & currents interaction
- Polar Oceans and climate change
- Altimeter sea level anomalies
- Ocean Currents
- Ocean Acidification
- Marine Inorganic Carbon

Access to Copernicus Sentinels 1,2, & 3
ESA, Earth Explorers & ESA TPM Data & Products

EO data	Data type	Data Policy	User Registration
1. ESA HIGH BIT RATE	ASAR, ERS SAR & ALOS PALSAR	FREE & OPEN Via On The Fly (OTF) system	ESA EO Single Sign On (SSO) account https://eo-sso-idp.eo.esa.int/idp/umsso20/registration
2. ESA LOW BIT RATE	ENVISAT(AATSR,MERIS,ASAR GM) & ERS (SAR,ATSR,RA) Products Information https://earth.esa.int/files/regproducts	FREE & OPEN	
3. ESA TPM	See list at: https://tpm-ds.eo.esa.int/collections/	FREE BUT some of them limited by quota and users restrictions and may require a scientific proposal. Details at: https://earth.esa.int/web/guest/pi-community/apply-for-data/3rd-party	
4. Copernicus Sentinels 1, 2 & 3	SAR, MSI, OLCI, SLSTR, SRAL OLCI-SLSTR Synergy (S3 Pre ops hub in schhub.copernicus)	FREE & OPEN	Data hubs https://scihub.copernicus.eu/ SRAL over water https://coda.eumetsat.int/#/home
5. ESA Earth Explorers Missions	GOCE CRYOSAT-2 SMOS SWARM	FREE & OPEN **NO REGISTRATION FROM JUNE 2018.** Download from EE mission corresponding repository: http://eo-virtual-archive1.esa.int/Index.html https://smos-ds-02.eo.esa.int/oads/access/ https://swarm-diss.eo.esa.int/ http://science-pds.cryosat.esa.int/	

Course Feedback – results of questionnaire (%) 42 respondents

	1. Fully Agree	2. Agree	3. Neutral	4. Disagree	5. Fully Disagree
Prior to the course, the information and material available on the website were appropriate?	36	50	12	2	0
The course was well-organised	60	38	2	0	0
Was the time allocated to each of the sessions appropriate?	36	57	5	2	0
Was the Course duration i.e. 5.5 days appropriate?	40	52	2	5	0
✓ The course has extended your knowledge of ESA and/or Copernicus Sentinels EO mission and instruments?	71	26	0	2	0
✓ Has the course extended your knowledge in the use of ESA, Copernicus Sentinels and Chinese EO data for ocean and coastal remote sensing and science applications?	71	29	0	0	0
The split between theory and practical sessions was well balanced	48	45	7	-	-
The practical sessions instructions were sufficient for the exercises	43	50	7	-	-

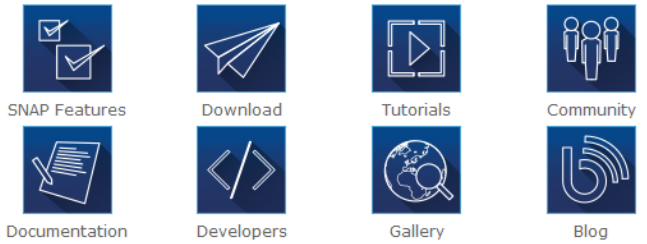
Toolboxes utilisation

Toolboxes	**Yes (%)**	**No (%)**
Will you use the **ESA SNAP Toolbox** in your future work?	98	2
Will you use **BRAT and/or GPOD** for processing radar altimetry data in your future research?	87	13
Will you use **Ocean virtual laboratory** in your future research?	92	8

Toolboxes – further training

SNAP toolbox further training (on-line)

- **tutorials accessible via STEP http://step.esa.int**



BRAT toolbox further training (on-line)

- **http://www.altimetry.info/toolbox/**
- **Youtube tutorials**

Ocean Virtual Laboratory further training (available soon, link will be provided on training web site)

Course Feedback
Strongest points of the course

- Practical sessions, guided use of the tools
- Extended knowledge of ESA, Copernicus Sentinels & Chinese EO missions' data
- Good balance / combination between theory & practicals
- Introduction / familiarisation to new Sentinels data and SNAP tool box for data processing
- Experienced team of lecturers who are professional, helpful, enthusiastic and experts in their respective fields.

Course Feedback
Weakest points of the course

- Course duration too short / too intense / not enough time to rest (a lot of theory and practicals in a short space of time)
  - **Model of the course is the same as in Europe, all lecturers have busy schedules**
  - **Please take away the course material and study again**
- Little time for questions / discussions / networking with other participants
  - **Coffee breaks, lunches, poster session and 2 social evenings are opportunities to get to know other research scientists**
  - **Exchange emails and keep in contact following the course**

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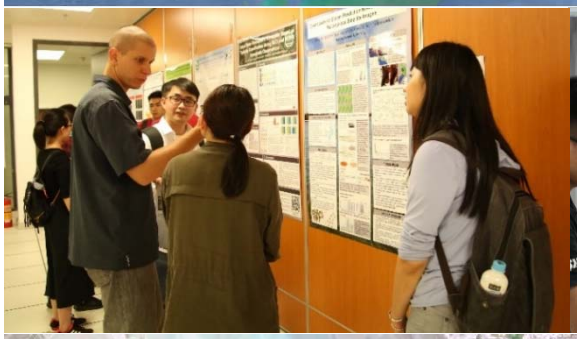
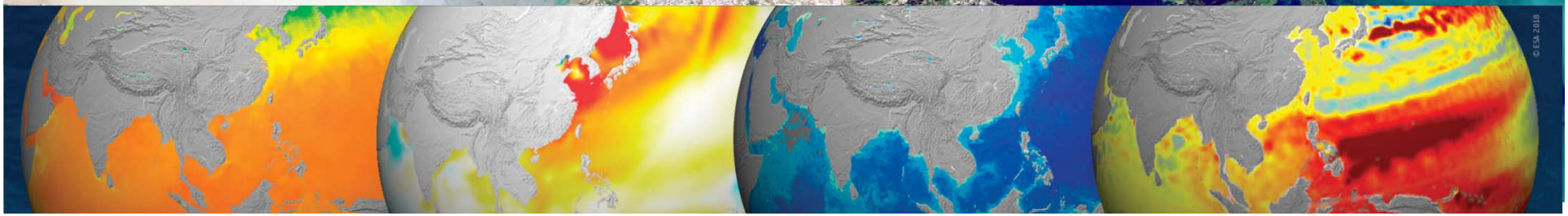


Lecturers: 20 scientists in optical, thermal & SAR RS

Participants: 60 trainees, MSc. & Ph.D. level

ESA & Sentinels EO data & toolboxes

Training on theory, instruments, data processing & retrievals



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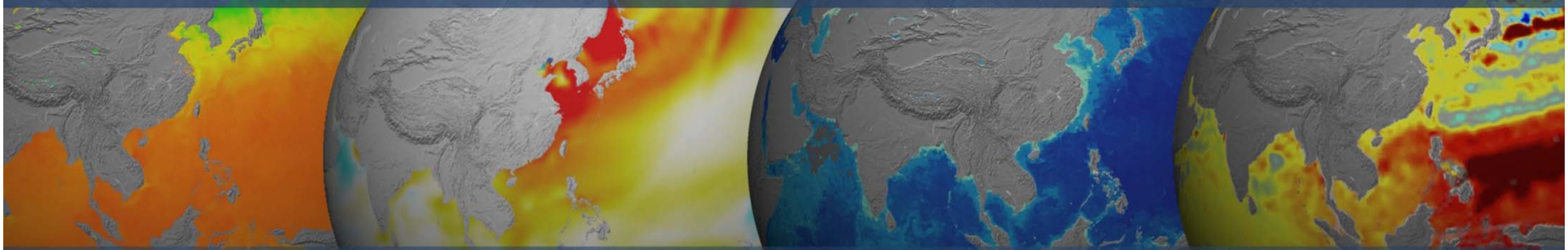

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